

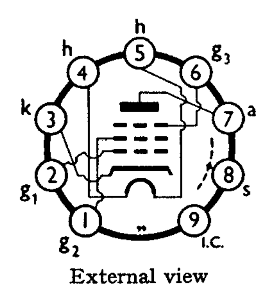
VIDEO POWER PENTODE

N309/PL83

FEBRUARY, 1956

A power pentode of high mutual conductance primarily designed for use as a video output valve in television receivers.

BASE CONNECTIONS AND VALVE DIMENSIONS



External view

Base Type : B9A
Bulb : Tubular.

Maximum Dimensions

Overall Length :	78	mm
Seated Length	72	mm
Diameter	22	mm

HEATER

I_h	0·3	A
V_h	15	V

MAXIMUM RATINGS

$V_{h\text{-}k}$	150	V
V_a	250	V
V_{g2}	250	V
p_a	9	W
p_{g2}	2	W

CHARACTERISTICS

Pentode Connection

V_a	170	200	250	V
V_{g2}	170	200	250	V
V_{g1} approx.	−2·3	−3·5	−5·8	V
I_a	36	40	36	mA
I_{g2}	5	5·5	5	mA
μ	410	450	840	
r_a	41	42	75	kΩ
g_m	10	10·7	11·2	mA/V

Triode Connection

$V_{a,\ g2}$*	170	200	V
V_{g1} approx.	−2·4	−3·4	V
$I_{a,\ g2}$	40	45	mA
μ	24	25	—
$r_{a,\ g2}$	1·92	1·84	kΩ
g_m	12·5	13·5	mA/V

* g2 connected to anode through 100 ohms resistor.

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TYPICAL OPERATION

Pentode Connection

Class A Amplifier. Single Valve

V_a	170	200	250	V
V_{g2}	170	200	250	V
V_{g1} (no sig.) approx.	−2·5	−3·0	−5·5	V
I_a (no sig.)	32	39	33	mA
I_{g2} (no sig.)	4·2	5·0	4·2	mA
r_a	5·0	5·0	5·0	kΩ
R_k	68	68	150	Ω
P_{out}	1·65	2·72	3·45	W
D	7·8	10·0	10·0	%

CAPACITANCES

Taken on an unscreened valve.

c_{in} 10·8 pF c_{out} 6 pF $c_{a\text{-}g}$ $<0{\cdot}1$ pF

MOUNTING

Any position.

SCREENING

No internal or external screening is fitted to the valve.

RETAINING

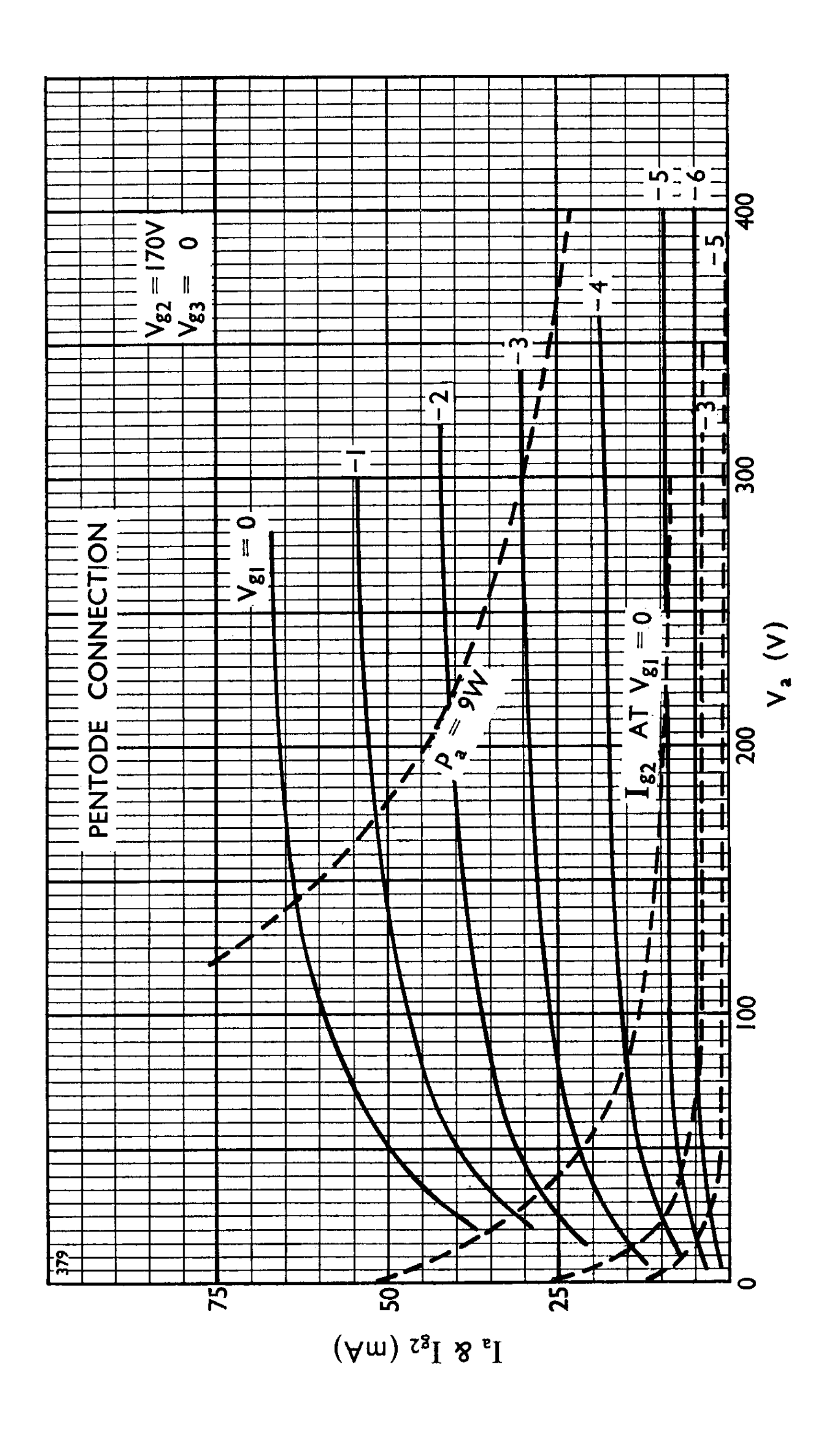
In equipment subject to vibration or shock a retainer is required.

VENTILATION

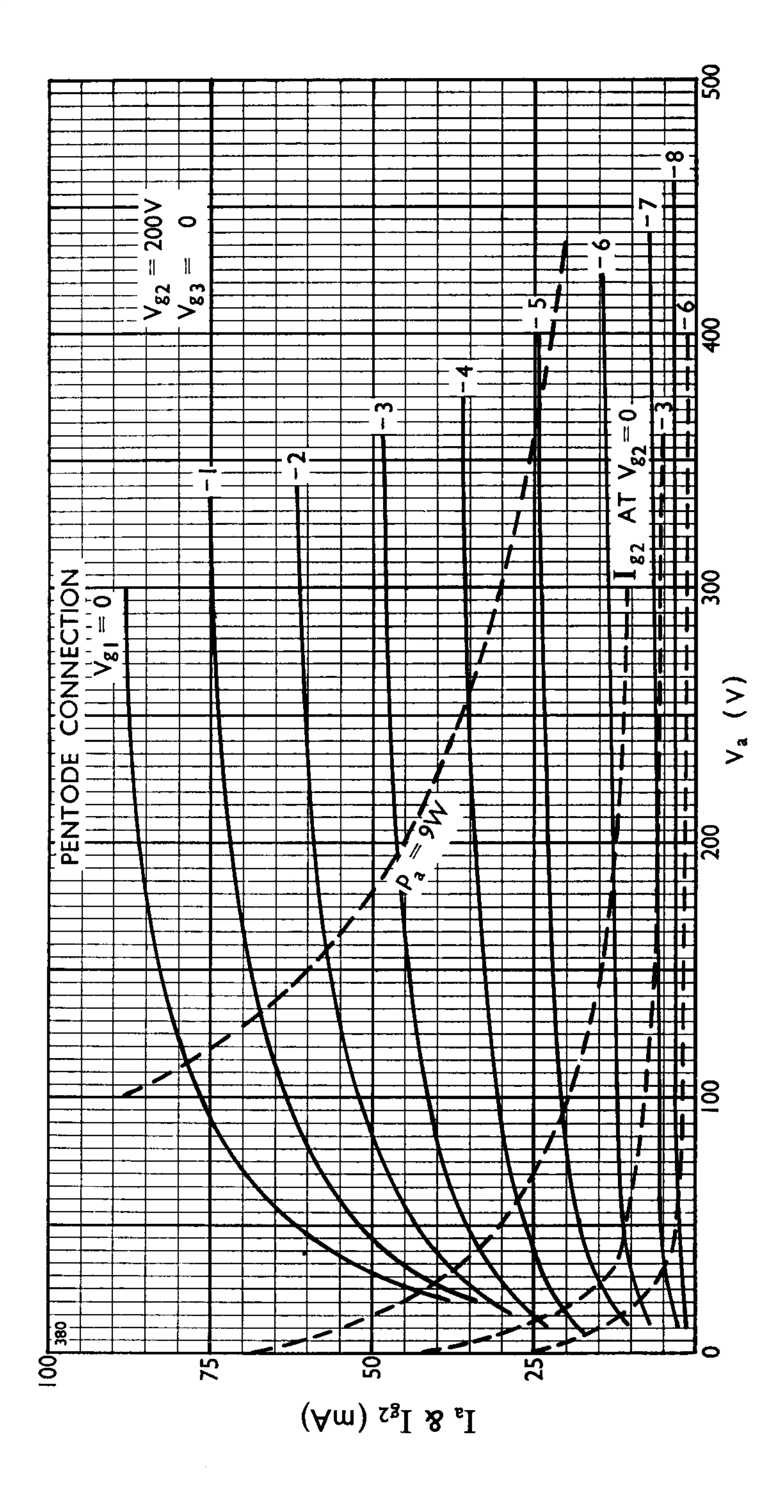
Free air circulation is preferable. The temperature of the hottest part of the bulb must not exceed 200°C.

MICROPHONY

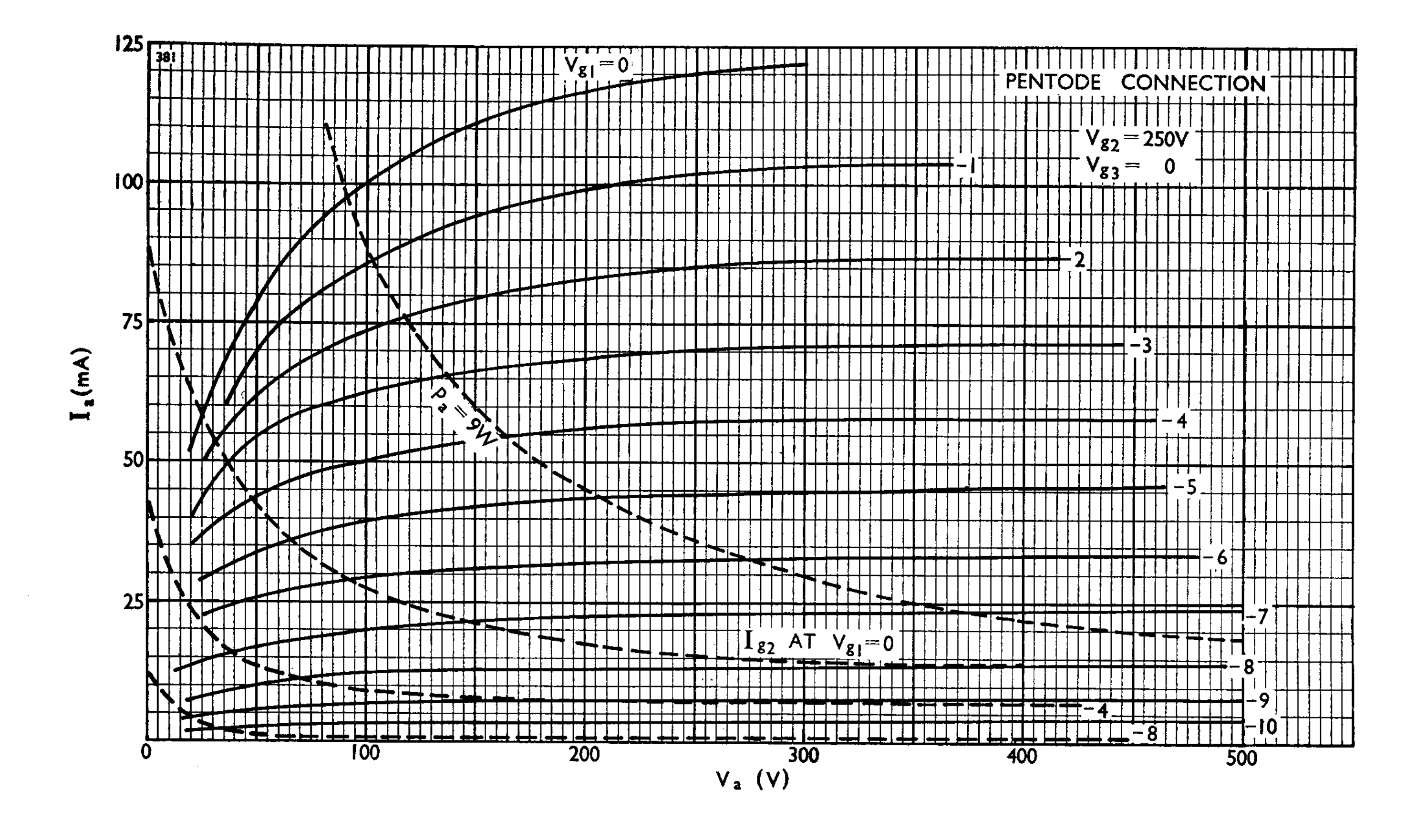
This type is free from microphony in normal receiver application.

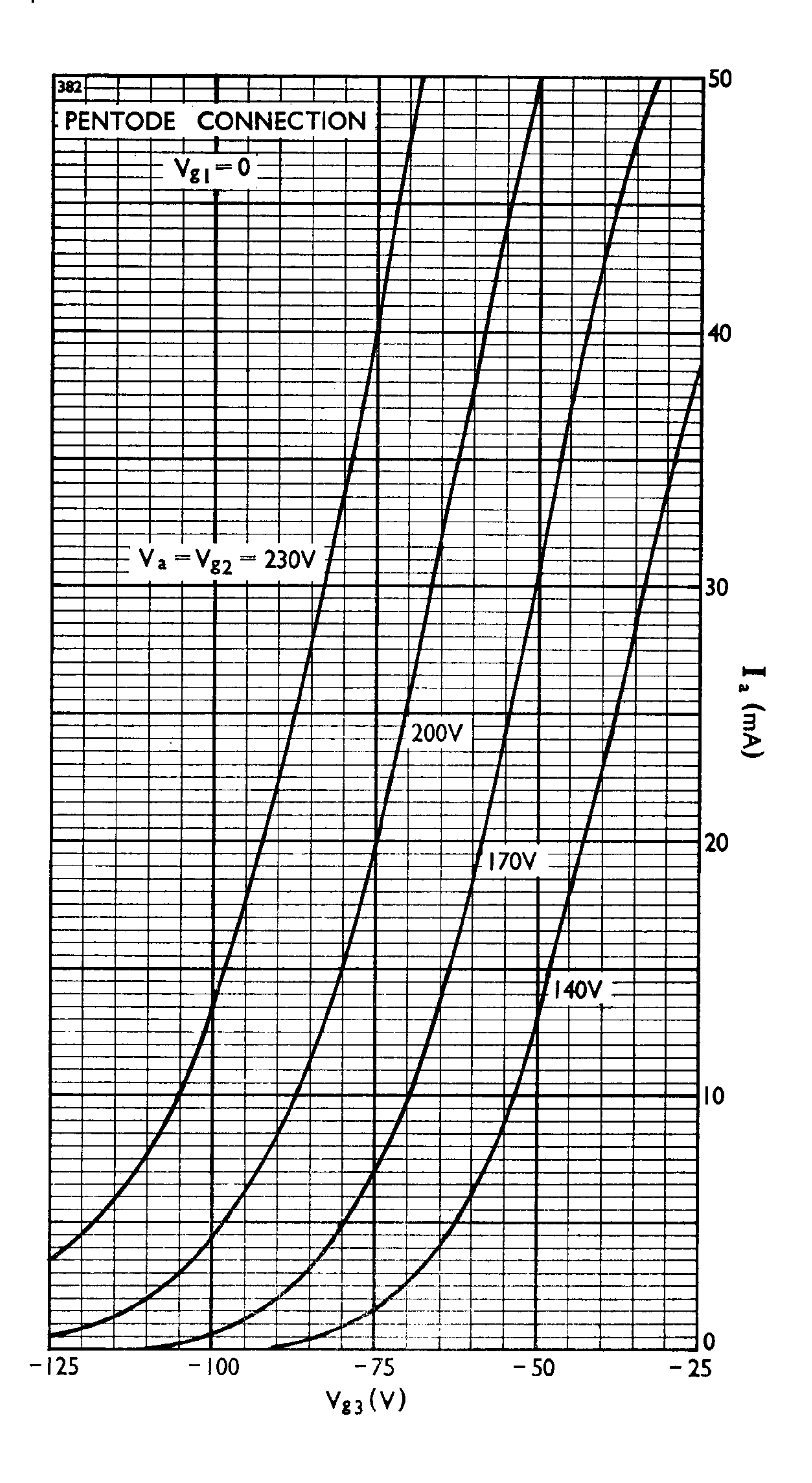


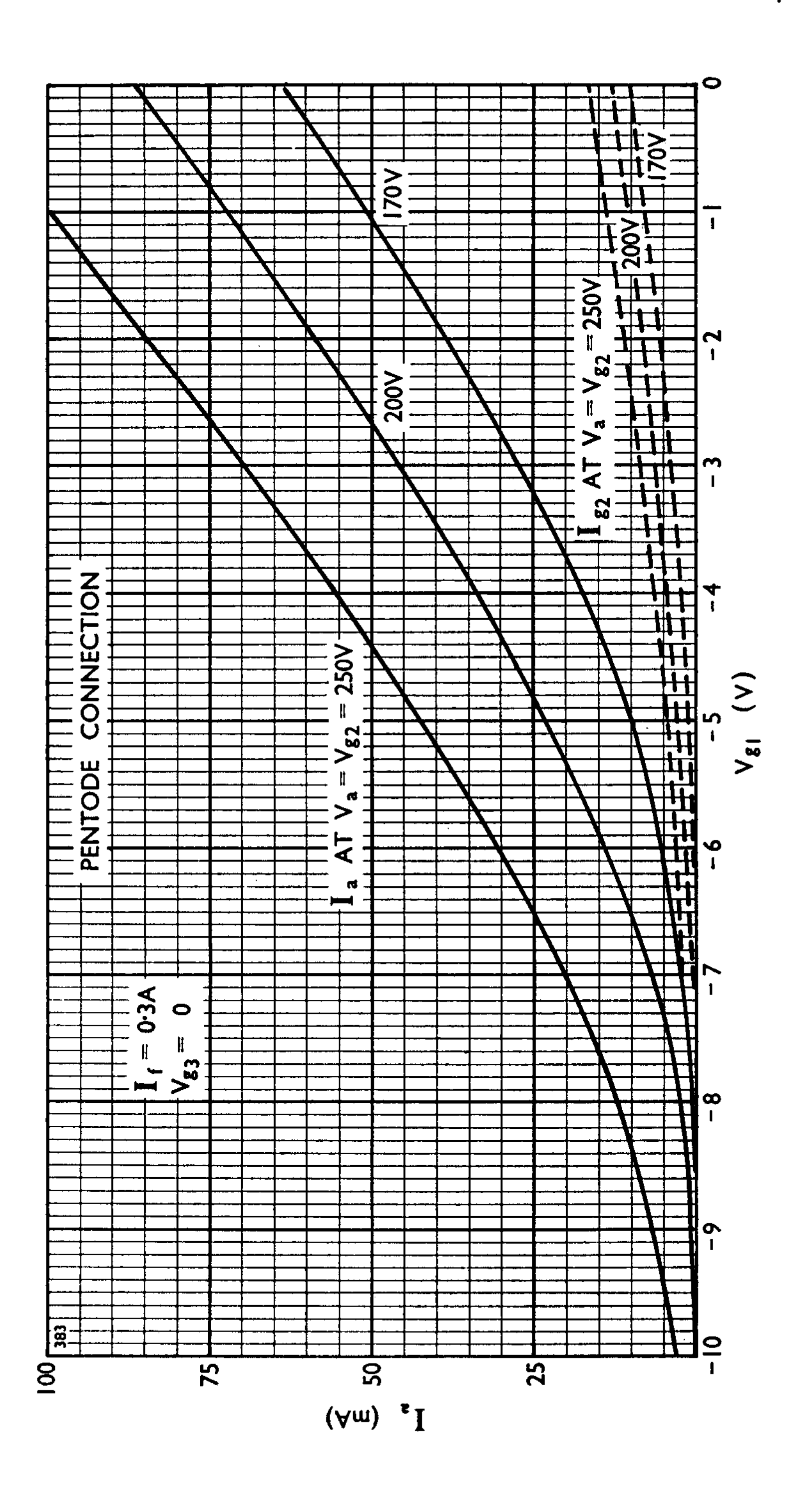
PENTODE CONNECTION
$V_{g2} = 170V$
$V_{g3} = 0$
$V_{g1} = 0$
−1
−2
−3
−4
−5
−6
$P_a = 9W$
I_{g2} AT $V_{g1} = 0$
−3
−5
V_a (V)
I_a & I_{g2} (mA)
0
100
200
300
400
25
50
75
379

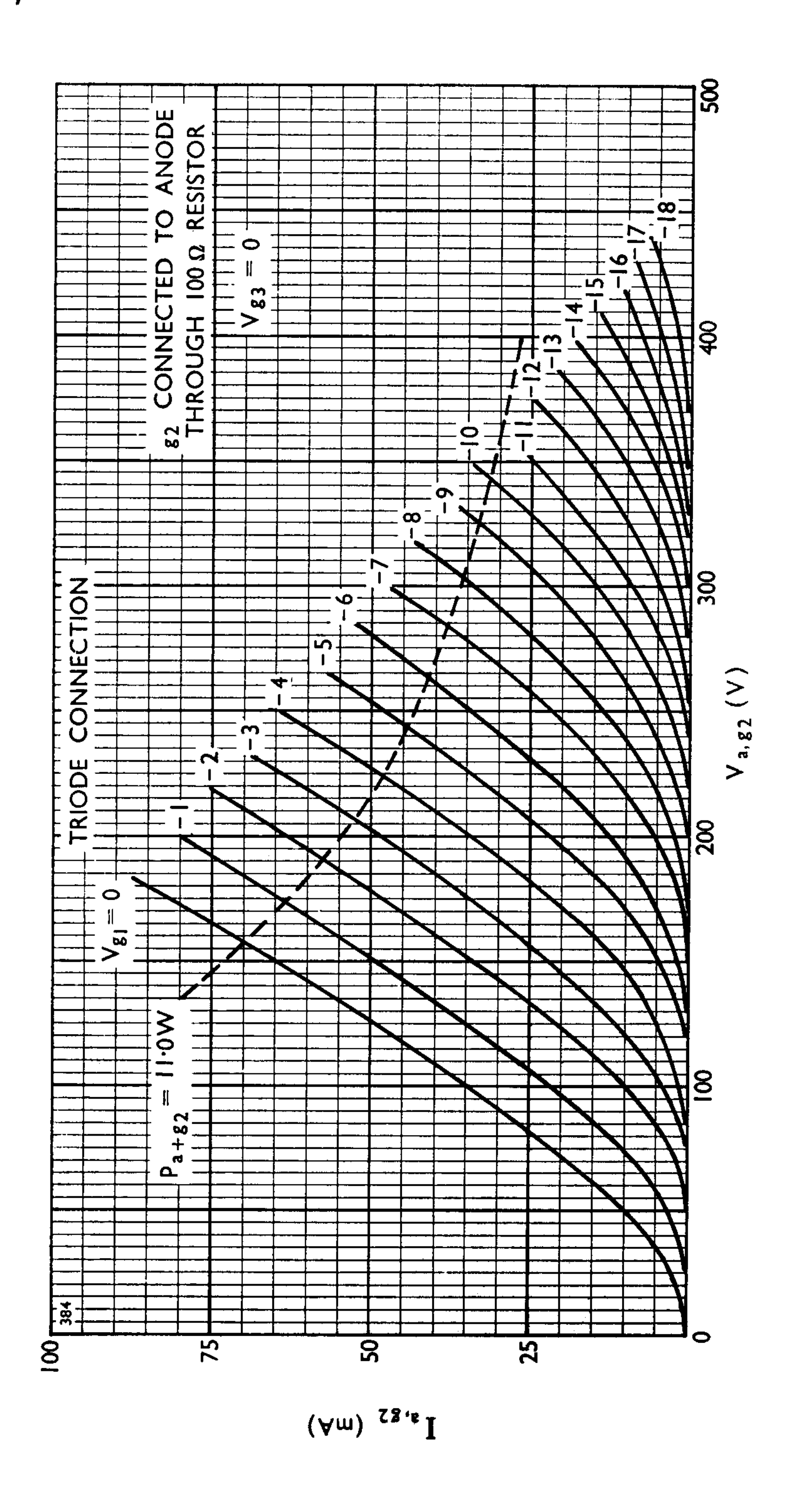


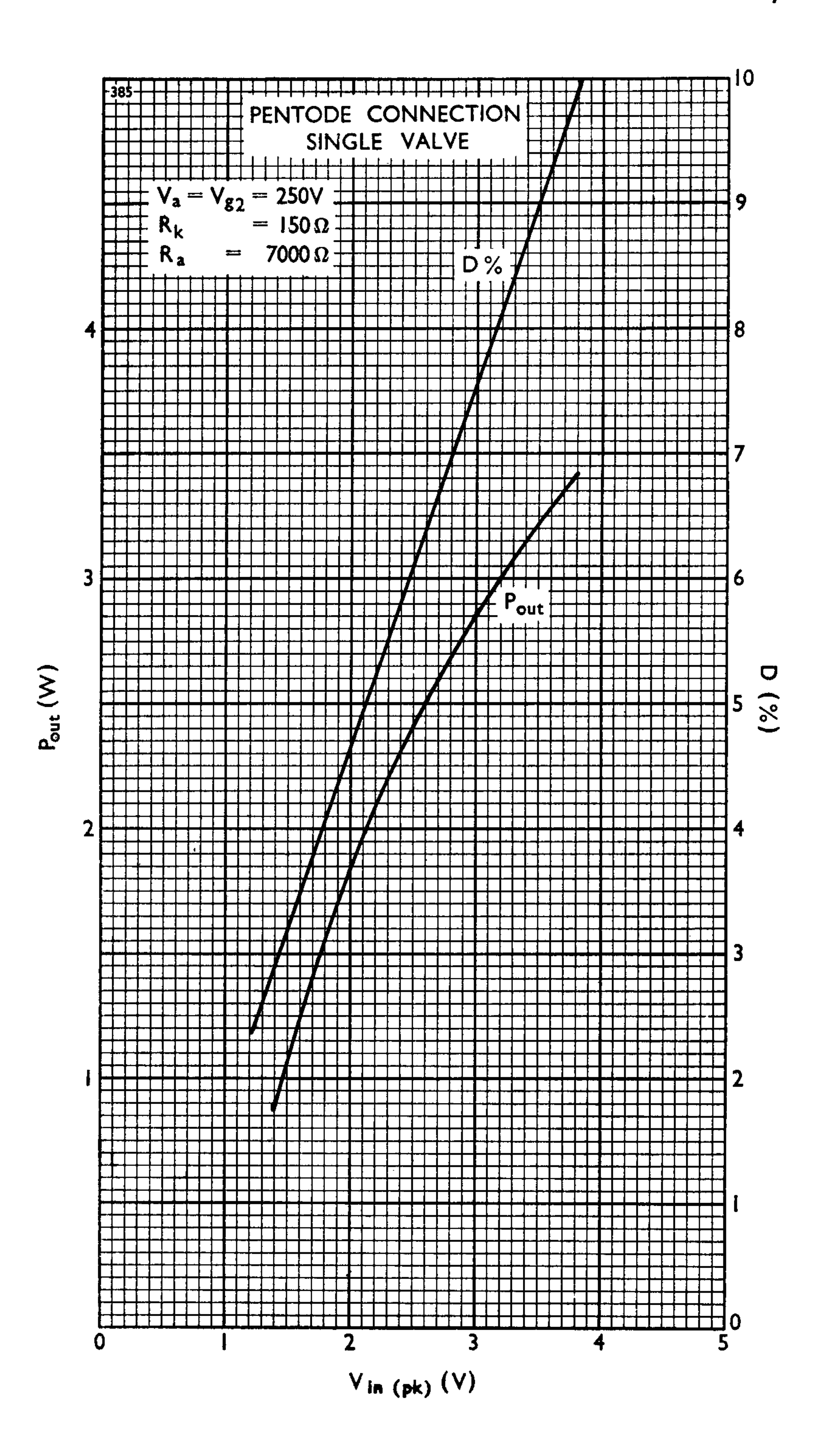
PENTODE CONNECTION
Vg1 = 0
Vg2 = 200V
Vg3 = 0
−1
−2
−3
−4
−5
−6
−7
−8
Pa = 9W
Ig2 AT Vg2 = 0
−3
−6
Va (V)
0
100
200
300
400
500
Ia & Ig2 (mA)
100
75
50
25
380

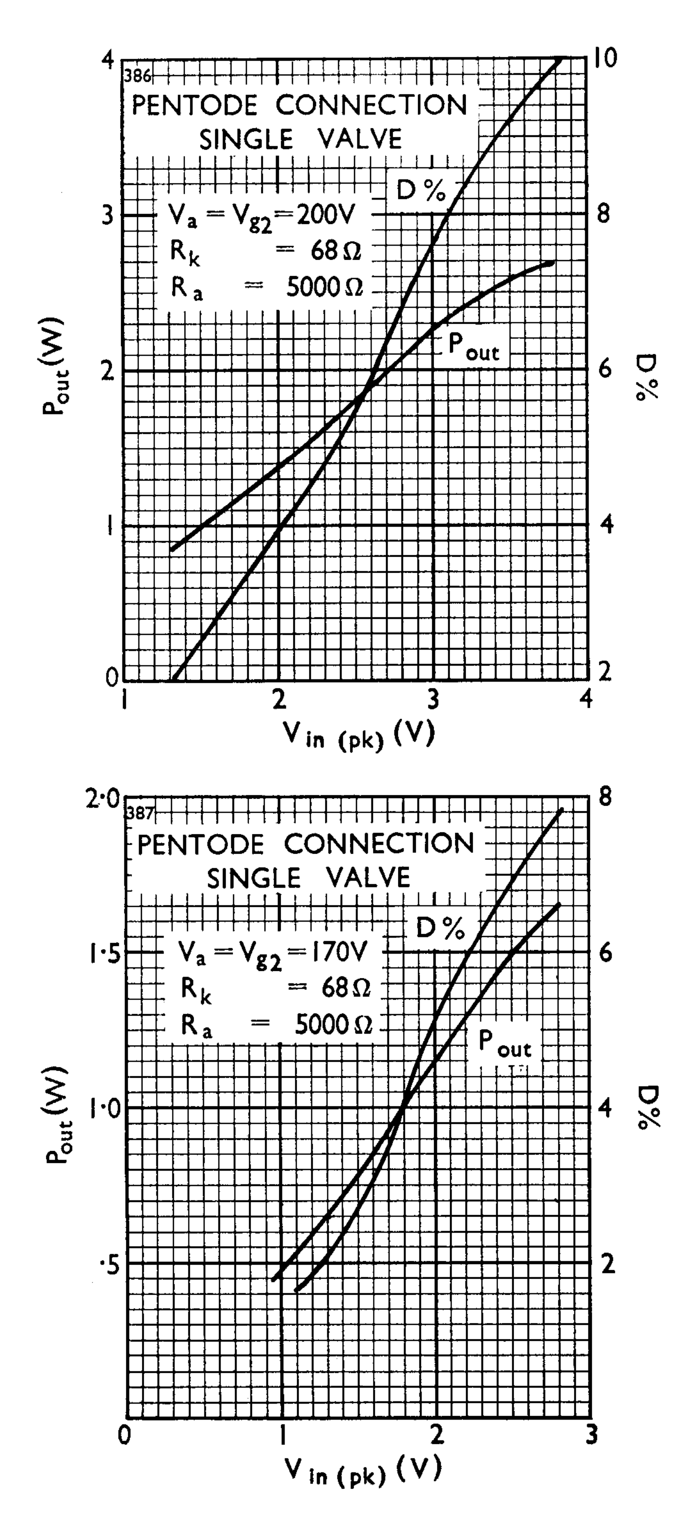

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PENTODE CONNECTION
$V_{g2}=250V$
$V_{g3}=0$
$V_{g1}=0$
−1
−2
−3
−4
−5
−6
−7
−8
−9
−10
−4
−8
$P_a=9W$
I_{g2} AT $V_{g1}=0$
I_a (mA)
125
100
75
50
25
0
100
200
300
400
500
V_a (V)


382
PENTODE CONNECTION
$V_{g1} = 0$
$V_a = V_{g2} = 230V$
200V
170V
140V
50
40
30
20
10
0
I_a (mA)
-125
-100
-75
-50
-25
V_{g3} (V)


PENTODE CONNECTION
I_f = 0·3A
V_g3 = 0
I_a AT V_a = V_g2 = 250V
200V
170V
I_g2 AT V_a = V_g2 = 250V
200V
170V
V_g1 (V)
I_a (mA)
0
−1
−2
−3
−4
−5
−6
−7
−8
−9
−10
100
75
50
25
383


TRIODE CONNECTION
g2 CONNECTED TO ANODE THROUGH 100 Ω RESISTOR
$V_{g3} = 0$
$V_{g1} = 0$
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
$P_{a+g2} = 11{\cdot}0W$
384
0
100
200
300
400
500
$V_{a,g2}$ (V)
25
50
75
100
$I_{a,g2}$ (mA)


385
PENTODE CONNECTION
SINGLE VALVE
$V_a = V_{g2} = 250V$
$R_k = 150\Omega$
$R_a = 7000\Omega$
D %
P_{out}
P_{out} (W)
D (%)
$V_{in\ (pk)}$ (V)
0
1
2
3
4
5
6
7
8
9
10


386
PENTODE CONNECTION
SINGLE VALVE
$V_a = V_{g2} = 200V$
$R_k = 68\Omega$
$R_a = 5000\Omega$
D %
P_{out}
P_{out} (W)
D %
$V_{in (pk)}$ (V)
0
1
2
3
4
2
4
6
8
10
387
PENTODE CONNECTION
SINGLE VALVE
$V_a = V_{g2} = 170V$
$R_k = 68\Omega$
$R_a = 5000\Omega$
D %
P_{out}
P_{out} (W)
D %
$V_{in (pk)}$ (V)
·5
1·0
1·5
2·0
0
1
2
3
2
4
6
8

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